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ABSTRACT

This industrial technology curriculum provides at-risk students in grades 7-12 with the opportunity to explore activities, understand occupational principles, and develop entry-level skills. Industrial technology courses provide in-depth experiences in the development of skills in tool and machine operation, material processes, drawing and interpretation, and basic technology concepts. Five program goals focus on emotional, intellectual, physical, social, and spiritual development. This curriculum guide contains an introduction and six sections: (1) curriculum parameters; (2) curriculum foci--traditional techniques, new technology, subject groupings, matrix, sample programs, teachers/instructors, and interaction; (3) skills/strategies development--learning domains, major understandings, skills objectives, attitudes, and scope and sequence; (4) curriculum organization and structure--junior high and secondary; (5) guidelines for program development--methodology, evaluation, records, resources, specific guidelines, and safety; and (6) implementation factors and responsibilities. (NLA)

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INDUSTRIAL TECHNOLOGY

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1. Arctic Bay students learn how to build snow houses.
2. Arctic Bay students learn to make traditional tools and clothing in the Industrial Technology laboratory.

Photos by Sue Ball

INDUSTRIAL TECHNOLOGY

7 - 12

CURRICULUM

School Curriculum Services
Department of Education
Northwest Territories

1991

History

Before 1982 secondary schools within the Northwest Territories adopted all courses from Alberta Education. Any course included in the Alberta Program of Studies and for which schools were equipped and staffed could be offered in Northwest Territories schools with accompanying Alberta credits. Many of our schools offered Alberta courses in Industrial Education.

In the late seventies and early eighties the Northwest Territories experienced an economic boom, as did all of Canada. Gold, oil and gas prices reached an all time high. Exploration activities provided some local employment and with it, spending power. In their quest for better jobs people realized that skills to compete for many positions were lacking. Local people demanded that education supply some of these skills. In response to that demand the Department of Education developed and implemented several, three-year specialization, Vocational Preparation Programs (V.P.P.). Necessary buildings, equipment, materials, tools and person years were provided. Classes in carpentry, automotives and general mechanics at regional secondary schools were full.

Students who were not interested in specializing in a V.P.P. could still take Industrial Education from the Alberta Program of Studies.

Suddenly, in the mid 1980's, the economic boom ended and recession resulted. Unemployment figures soared and secondary school students no longer saw a need for specialized training in trade related courses and the Department of Education could do little to change the picture. By 1986 interest and enrolment in vocational preparation courses were such that courses were no longer viable.

Directors and Superintendents of Education realized that it was necessary to develop a more generic curriculum that would meet the needs of all N.W.T. students. The Vocational Preparation Programs had outlived their usefulness and had to be replaced. Specialization could be done, where necessary, by industry and/or the Arctic College. The Department also took the position that schools should provide general, basic education and not training for specific jobs.

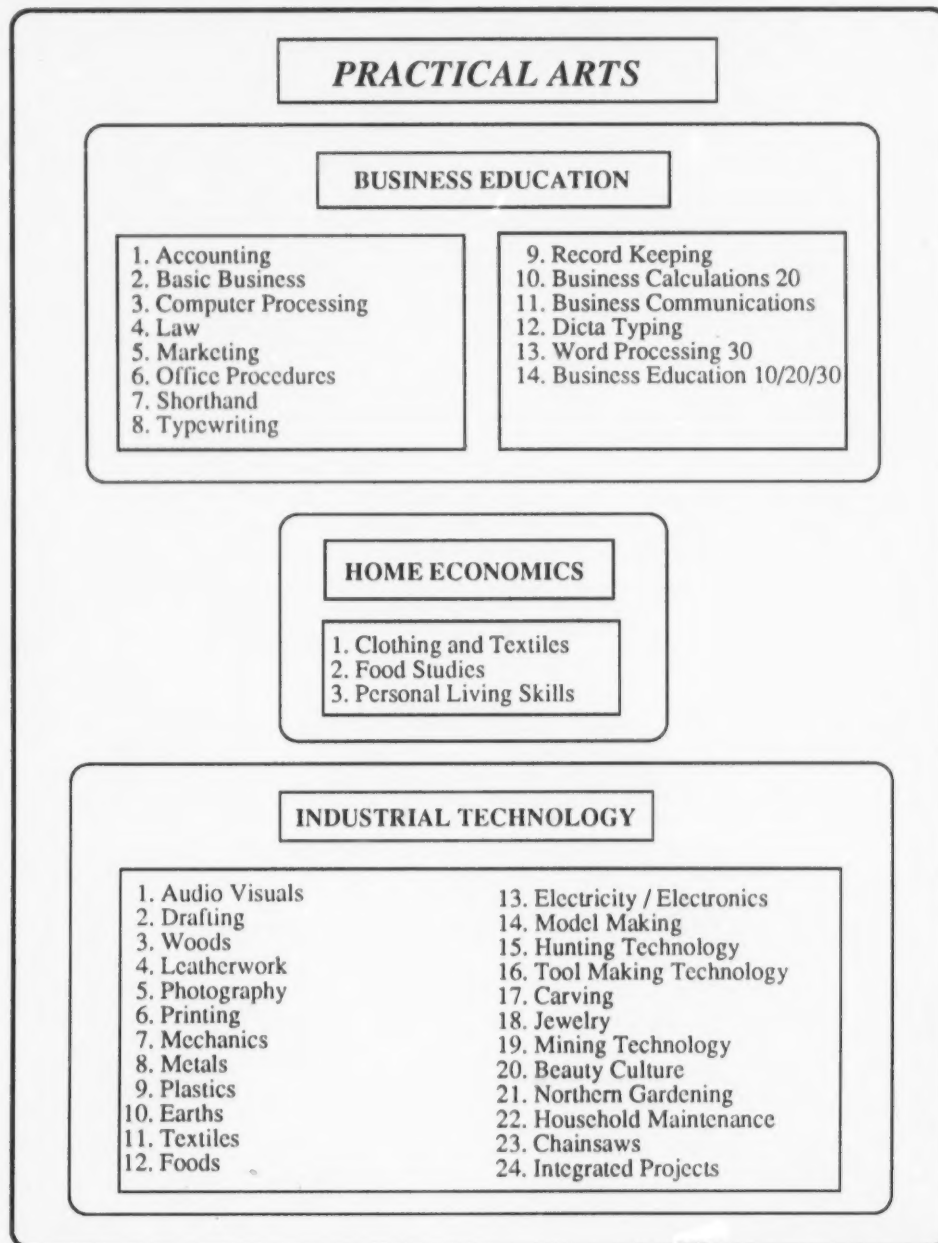
The Department has since concentrated its efforts on the development of a curriculum in Industrial Technology.

RELATIONSHIP BETWEEN INDUSTRIAL TECHNOLOGY AND PRACTICAL ARTS

Industrial Technology is a component of Practical Arts.

Practical Arts

Practical Arts consists of courses which provide a continuum of experiences, starting with exploratory activities and expanding to the development of skills related to career fields. This development of the student's skills is planned for through curricula in Business Education, Home Economics and Industrial Technology leading to employment, or entry into a post-secondary institution for further education.



Acknowledgements

The Government of the Northwest Territories Department of Education gratefully acknowledges the contribution made by the many teachers, principals, directors, superintendents who responded to the Interim Curriculum Guide for Industrial Technology through comments and recommendations, many of which have been embodied in this publication.

Special recognition is given to the members of the Subject Advisory Committee who not only participated in the development of the guide but have also contributed to the development of supplementary resource materials for teachers.

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INDUSTRIAL TECHNOLOGY

Introduction

The Industrial Technology curriculum is designed to provide students with the opportunity to explore a wide variety of practical activities while at the same time developing an understanding of the principles and skills required in the various occupations. Students learn to work in an environment which is conducive to challenging their intellect and developing their talents in a number of technical and craft areas. They become aware of the inter-relationship and inter-dependency of one technology upon another and learn to apply knowledge acquired in other disciplines to their laboratory work.

CURRICULUM PARAMETERS

Rationale

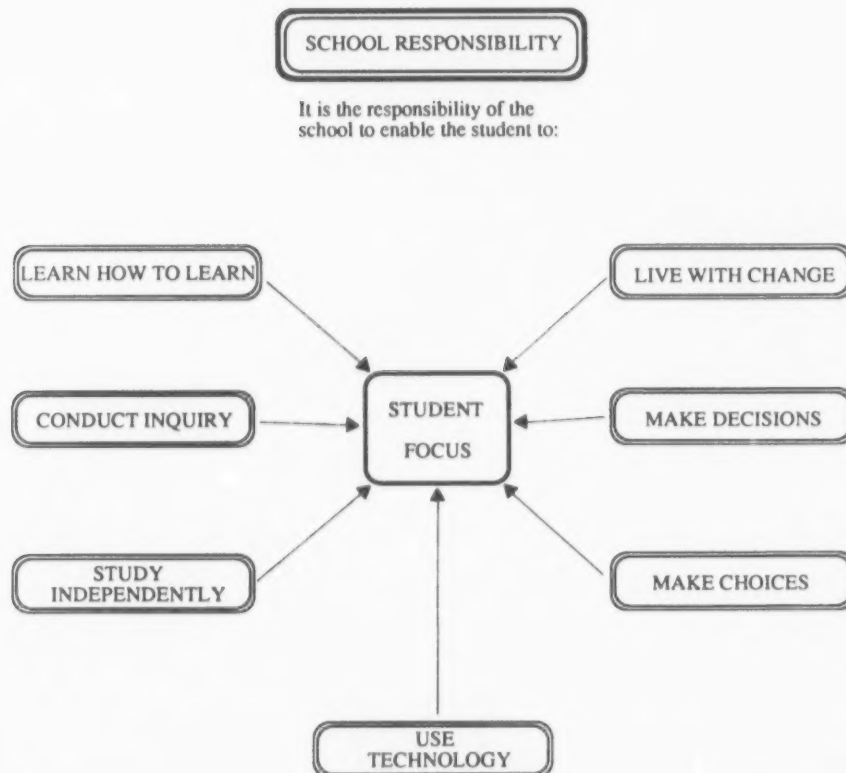
Industrial Technology adds another dimension to the program for educating young people at the secondary school level. For many students it will provide unique options to help prepare them for the life ahead while enjoying their current studies. *Students must be helped to discover how to learn, to conduct inquiry, to study independently, to make choices and decisions, to use technology, and to live with change.*

The Industrial Technology curriculum is concerned with personal development. Many students drop out of school before they have completed the requirements for secondary school graduation. Industrial Technology may be an incentive for "at risk" students to remain in school until they have graduated as it is in Industrial Technology that such students experience success and develop self confidence. Currently, careers do not develop along predictable lines. Our schools must, therefore, provide considerable flexibility so that students have several career choices. A person who has been broadly educated is able to learn what he/she needs to know, within limitations, about a new job. The future worker needs a broad as well as an experience-based education. Such an education offers him/her subsequent chances for rapid and successful specialization. The learning experiences should be such that they become the basis upon which specialization can be built.

Our task in the school then, is to provide students not only with *entry skills for several careers but to orient the program to meet the student's emotional, intellectual, physical, social,*

and spiritual goals. This means that the various courses or disciplines must be interrelated. **Industrial Technology provides a unique opportunity for the teacher to demonstrate these relationships and further, to capitalize on them by means of motivation created through practical applications.** Thus, the experiences to which students are exposed should provide them with realistic criteria for career guidance.

Industrial Technology can take the student from an awareness or familiarization stage to exploration, orientation, preparation and, in some cases, to an occupation. These courses provide in-depth experiences in the **development of skills in tool and machine operation, material processes, drawing and interpretation and a knowledge of the basic concepts related to the technologies.** All courses should place emphasis on practical work and applied theory.



Current Trends

This technological age has created new machinery, equipment, tools and aids designed and programmed for accuracy, speed, efficiency and convenience. Automated equipment can now detect and identify problems with machinery on the assembly line, vehicles, engines; determine the solution to the problem and in some cases make necessary repairs. Advances in technology are happening at such a rapid rate that ten year old equipment may already be obsolete.

In the workplace, the use of lasers, robots and computerized equipment and machinery, is quickly replacing the need for manual labour. New inventions, advancement and changes are the results of cooperative efforts by science and technology. A growing need for technicians, explorers, inventors, designers and craftspersons to further advance technology will partially solve the unemployment problem. We can no longer consider the production of manufactured goods as the major source of employment. We must create our own jobs or become more involved with the service industries. To assist them in making wise career choices, students must be made aware of these trends.

Students acquire knowledge, develop skills, learn processes/strategies in a variety of ways:

traditional student/teacher/classroom setting

computer programs used as a method of self-directed learning

distance education

co-operative teaching where skills and knowledge are learned through communication with at least two people, one of whom is not a school staff member. Part of the learning will occur outside of the classroom.

Goals of Industrial Technology

The goals / objectives of the Industrial Technology curriculum reflect the five areas of growth essential to the well being of every individual. Some goals may overlap several areas of growth.

Emotional -

to provide the student with a sense of accomplishment, pride and self confidence

Intellectual -

to provide a technical environment which motivates and stimulates the individual

to assist in the development of positive attitudes toward safety;

to assist in the development of consumer literacy

to provide the student with opportunities, within a technical environment, to become acquainted with the general occupational characteristics of a variety of career fields

to relate the student's interests, abilities, likes, dislikes and values to several career fields

to develop an understanding of the interrelationships between a variety of disciplines and technologies

to provide a technical environment which permits students to synthesize their accumulated knowledge in the solution of practical problems.

Physical -

to provide safe exploratory experiences in the use of tools, energy, equipment and materials appropriate to various technologies prevalent in a productive society;

Social -

to assist students in the discovery of their interests and the development of personal and social responsibilities;

to enable the student to function successfully in a multi-lingual, multi-cultural society;

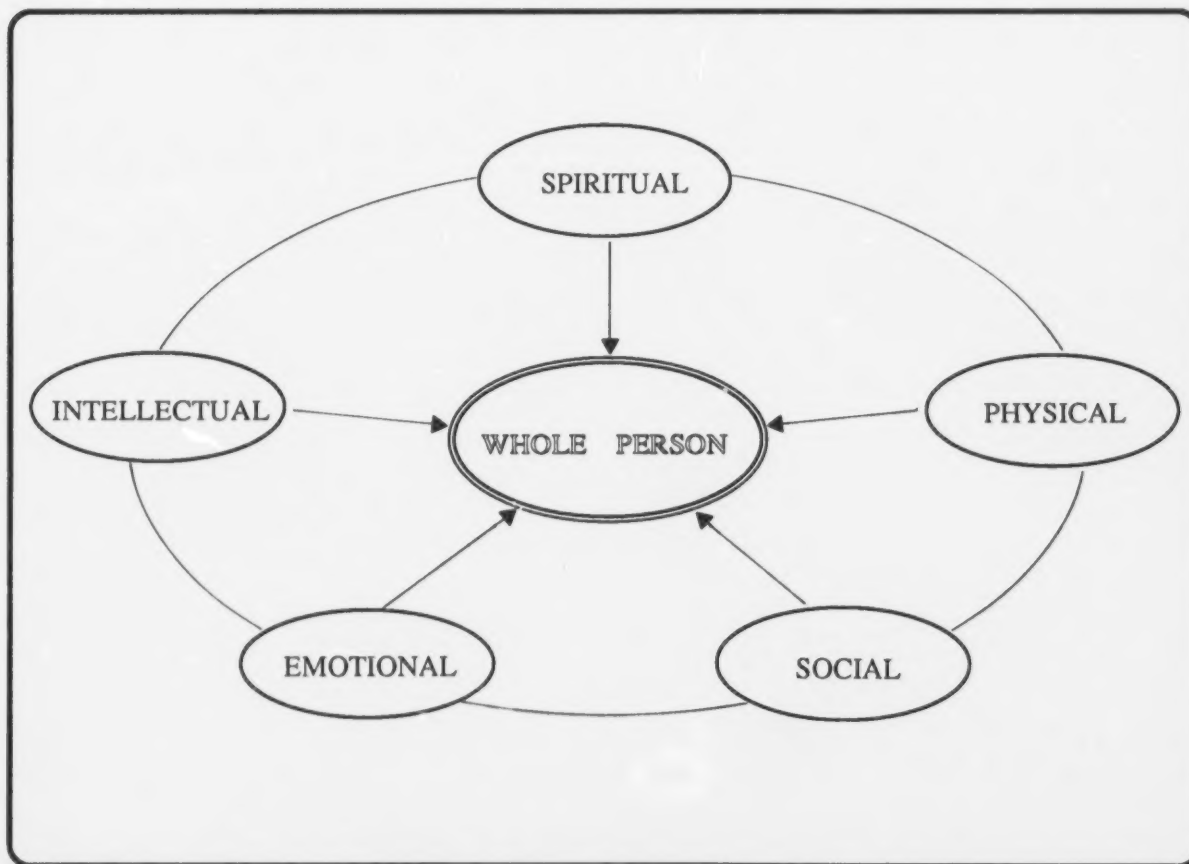
Spiritual -

to assist in the development of a positive self-image;

to assist in the development of positive attitudes toward conservation and the environment;

to know who he/she is and to respect his/her culture and the culture of others.

PERSONAL GROWTH



Curriculum Foci

Introduction

The Industrial Technology curriculum consists of 24 subject groupings (areas of study), each containing a number of modules. Modules within each subject grouping are sequenced.

Courses may be created by selecting combinations of 3, 4 or 5 of these modules for 3, 4 or 5 secondary school credits. Modules should be carefully chosen to meet the needs of students while at the same time giving due consideration to factors such as *suitability of facilities, equipment availability, supply costs and teacher experience and/or training.*

Industrial Technology in the junior high school provides the opportunity for the students to explore, reason, experiment, and discover the reality of the technological society in which they live. The curriculum deals with materials, processes, products, occupations, and the problems resulting from the impact of technology on society.

Many students may not have been previously exposed to technology. The students may, therefore, be unfamiliar with tool names and terminology used in an Industrial Technology laboratory setting. Under such circumstances **the teacher should be prepared to teach the students the names of tools and equipment and the meaning of the terminology being used.**

Traditional Techniques

Many of the subject groupings included in the curriculum pertain to a more traditional life style experienced by aboriginal peoples of the arctic/sub-arctic. Complete programs may be designed with a cultural background. All courses should be meaningful and relevant to the students.

New Technology

New topics such as rocketry, laser technology, computer programming, robotics may now be delivered through distance education and/or computer programs as well as by conventional methods. Techniques previously performed manually are being completed through modern computer assisted programs (e.g. Drafting). Although specific modules have not been included in the matrix, wherever possible, students should be given the opportunity to learn basic concepts of modern high technology and be encouraged to experiment with new fields and ideas.



Holman students learn print making through cooperative efforts of school and local co-op.

SUBJECT GROUPINGS

1. Audio Visuals
2. Drafting
3. Wood
4. Leatherwork
5. Photography
6. Printing
7. Mechanics
8. Metals
9. Plastics
10. Earths
11. Textiles
12. Foods
13. Electricity/Electronics
14. Model Making
15. Hunting Technology
16. Tool Making Technology
17. Carving
18. Jewelry
19. Mining Technology
20. Beauty Culture
21. Northern Gardening
22. Household Maintenance
23. Chainsaws
24. Integrated Projects

MATRIX : Subject Groupings and Modules

AUDIO VISUALS
Audio Visuals I (Basic) *
Audio Visuals II (Advanced)
DRAFTING
Drafting I (Basic) *
Drafting II (Advanced)
Drafting - Architectural (Basic)
Drafting - Architectural (Advanced)
Drafting - Mechanical (Basic)
Drafting - Mechanical (Advanced)
Computer Assisted Drafting
WOOD
General Woods I *
General Woods II *
General Woods III *
Woodturning (Basic) *
Woodturning (Advanced)
Frame Construction (Basic)
Frame Construction (Intermediate)
Frame Construction (Advanced)
Cabinet Making (Basic)
Cabinet Making (Intermediate)
Cabinet Making (Advanced)
Boat Building (Basic)
Boat Building (Intermediate)
Boat Building (Advanced)
LEATHERWORK
Leatherwork (Basic) *
Leatherwork (Intermediate)
Leatherwork (Advanced)
PHOTOGRAPHY
Photography (Basic) *
Photography (Intermediate) *
Photography (Advanced)

PRINTING
Lithography (Basic) *
Lithography (Intermediate)
Lithography (Advanced)
Silk Screen (Basic) *
Silk Screen (Advanced)
Relief Printing (Basic) *
Relief Printing (Advanced)
MECHANICS
Small Vehicle Utilization *
Small Engines (Basic) *
Small Engines-Outboards (Intermediate) *
Small Engines-Outboards (Advanced)
Small Engines-Tracked (Intermediate) *
Small Engines-Tracked (Advanced)
Small Engines-Wheeled (Intermediate) *
Small Engines-Wheeled (Advanced)
Vehicle Body Repair
Alternate Power Technology *
Automobile Care
Automobile Tune-up
Mechanical Systems
METALS
Metals - General (Bench) *
Metal Casting *
Machining (Basic) *
Machining (Intermediate)
Machining (Advanced)
Oxy-Acetylene Welding (Basic)
Oxy-Acetylene Welding (Advanced)
Arc Welding (Basic) *
Arc Welding (Advanced)
Sheet Metal (Basic) *
Sheet Metal (Intermediate)
Sheet Metal (Advanced)

PLASTICS
Plastics (Basic) *
Plastics (Advanced) *
EARTHS
Pottery / Ceramics (Basic) *
Pottery / Ceramics (Intermediate) *
Pottery / Ceramics (Advanced)
Glasswork (Basic) *
Glasswork (Advanced)
TEXTILES
Textiles (Basic) *
Textiles (Intermediate)
Textiles (Advanced)
FOODS
Food Preparation (Basic) *
Food Preparation (Advanced)
ELECTRICITY / ELECTRONICS
Electricity / Electronics (Basic) *
Electronics (Intermediate)
Electronics (Advanced)
MODEL MAKING
Model Construction (Basic) *
Model Construction (Advanced)
HUNTING TECHNOLOGY
Hunting Technology (Basic) *
Hunting Technology (Intermediate) *
Hunting Technology (Advanced)
TOOL MAKING TECHNOLOGY
Traditional Tool Making (Basic) *
Traditional Tool Making (Advanced)
Contemporary Tool Making (Basic) *
Contemporary Tool Making (Advanced)

CARVING
Carving (Basic) *
Carving (Intermediate)
Carving (Advanced)
JEWELRY
Jewelry (Basic) *
Jewelry (Advanced)
MINING TECHNOLOGY
Survey of Industry *
BEAUTY CULTURE
Beauty Culture (Basic) *
Beauty Culture (Intermediate)
Beauty Culture (Advanced)
NORTHERN GARDENING
Landscaping (Basic) *
Landscaping (Advanced)
Plants (Basic) *
Plants (Advanced)
Outdoor Gardening (Basic) *
Outdoor Gardening (Advanced)
HOUSEHOLD MAINTENANCE
Household Maintenance (Basic)
Household Maintenance (Intermediate)
Household Maintenance (Advanced)
CHAINSAWS
Chainsaws (Basic)
Chainsaws (Advanced)
INTEGRATED PROJECTS
Integrated Projects (Intermediate)
Integrated Projects (Advanced)

* Modules identified by an asterisk (*) may be taught at the junior secondary level.

SAMPLE PROGRAMS

JUNIOR SECONDARY

- A Audio Visuals I
Drafting I -basic
- or
- B General Woods I
Photography -basic
- or
- C Metals - General (bench)
Food Preparation -basic
- or
- D Small Vehicle Utilization
Small Engines -basic
- or
- E Textiles -basic
Beauty Culture -basic
- or
- F Leatherwork -basic
Plastics -basic
Jewelry -basic
- or
- G General Woods I
General Woods II
General Woods III

SENIOR SECONDARY

- A (3) Hunting Technology -basic
Hunting Technology - intermediate
Hunting Technology - advanced
- or
- B (3) Audio Visuals I
Photography -basic
Lithography -basic
- or
- C (3) Photography -basic
Food Preparation -basic
Plants -basic
- or
- D (5) Electricity / Electronics -basic
Survey of Industry
Household Maintenance -basic
Textiles -basic
Chainsaws -basic
- or
- E (5) Pottery and Ceramics -basic
Pottery and Ceramics -intermediate
Pottery and Ceramics -advanced
Glasswork -basic
Glasswork -advanced

Draft outlines of initial programs may be created by selecting subject groupings which a Board/Region/school is equipped and staffed to offer. The Board/Region/school may then choose the grade appropriate modules from within these subject groupings to form junior and/or senior secondary programs. Modules may be selected from a variety of subject groupings or may all be chosen from the same subject grouping. However, modules are sequenced within each subject grouping. Only modules which have been identified in the matrix as junior high modules may be used at that level.

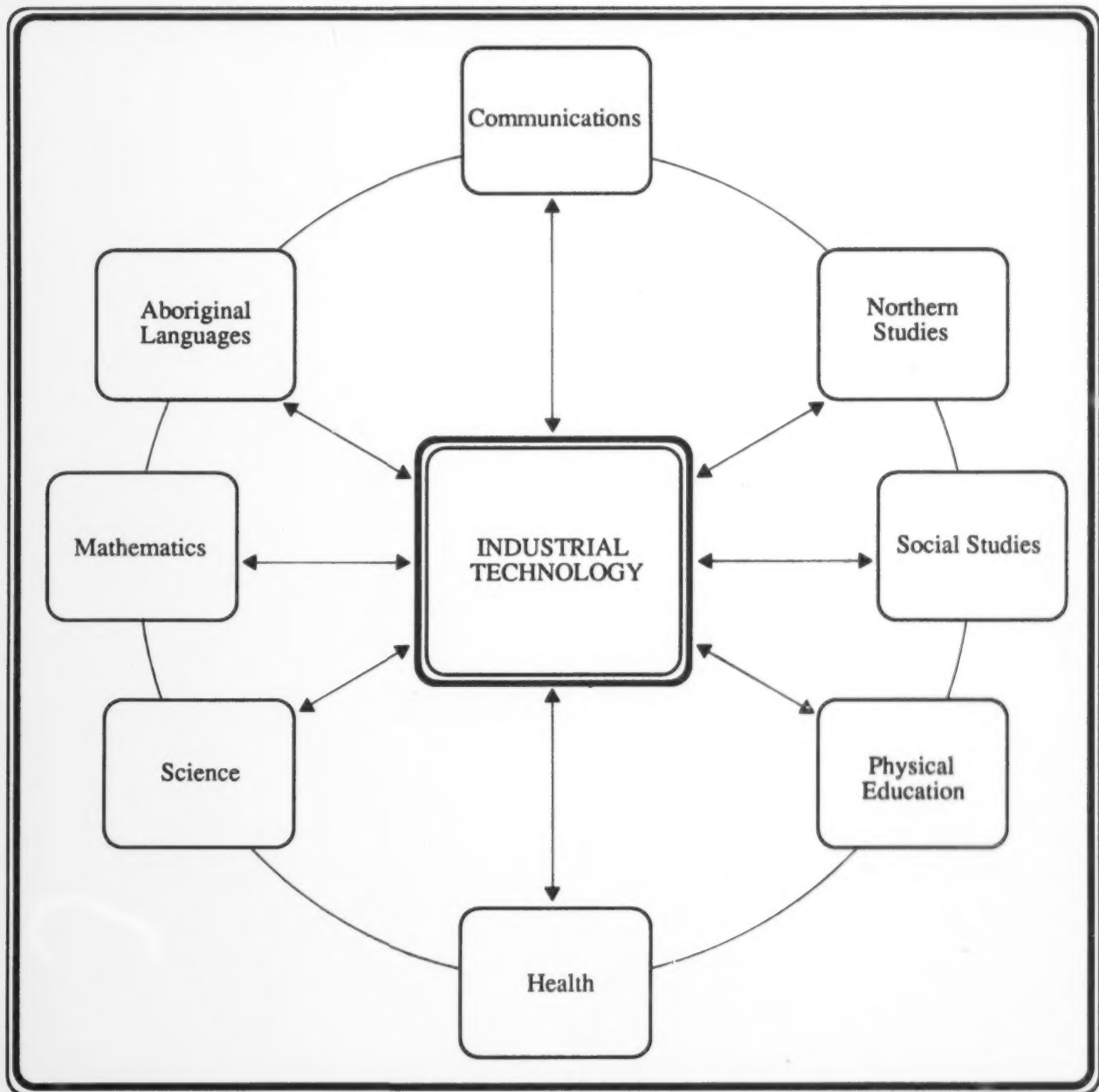
Teachers /Instructors

Some identified modules may be taught by staff members other than the Industrial Technology instructor. The Science, Mathematics, Social Studies, English teachers may have both the experience and knowledge to teach some modules or they may wish to incorporate Industrial Technology skills in their subject area or reinforce knowledge taught in their classes through practical experience. **Cooperation between teachers may lead to their sharing in an Industrial Technology program.** The English teacher who enjoys cooking, the Mathematics teacher who has a "green thumb", the Social Studies teacher who is a "camera buff", could cooperate with the Industrial Technology teacher and share their expertise with students through a program which included modules in foods, northern gardening and photography. The team teaching approach may also be used to teach topics within modules. Other sharing may result from open discussion on topics and units being taught in other disciplines. **Often it is possible to reinforce concepts, ideas, knowledge through Industrial Technology.**

Other modules may best be taught by a local, experienced, person. Several schools have locally developed, L.E.A. sponsored, "Land" programs usually conducted by people from the community. Industrial Technology teachers may be able to solicit their help by assisting them with their program development and delivery in exchange for local help with the delivery of such modules as traditional tool making, hunting technology, etc.

Yet another possibility exists. Teachers may be able to recruit help from experienced local people who may not otherwise be involved with the school. **Involvement of the local population and cooperation between staff members contributes to the success of education and tends to knit school and community closer together.**

INTERACTION



Skills / Strategies Development

Through the three domains of learning (cognitive, affective, psychomotor) students develop skills in:

- thinking
- problem solving
- conducting inquiry
- using technology
- making choices and decisions
- coping with continual change

Cognitive Domain

Knowledge is gained as a result of critical and creative thinking. Critical thinking skills are developed through problem solving and choice and decision making. Creative thinking results in new ideas and/or products.

Thinking skills result from:

- listening
- reading
- questioning
- observing
- doing

Affective Domain

The affective domain is difficult to evaluate as it deals with attitudes and behaviours. These are either states of mind respecting some matter or indications of opinion or purpose. Evaluation is purely subjective and must be conducted through continuous observation.

Attitudinal goals of Industrial Technology include:

developing positive attitudes toward safety

excellence in the performance of manual skills

project completion

Psychomotor Domain

Psychomotor skills involve coordination between muscular movement and acquired knowledge (hand and eye). Students develop psychomotor skills through:

identifying, handling, manipulating materials;

performing measurements, conducting experiments;

acting upon materials.

Major Understandings

Major understandings suggest the kind of generalizations or conclusions students might reach about the subjects they have studied.

Techniques, knowledge and skills acquired in the production of projects will assist students in determining their limitations and future career paths, and help them face new challenges.

The major understandings associated with Industrial Technology are:

People who supply goods and services play a very important role in society.

Historically, people developed and used technology (traditional tools) that was well adapted to their environment and needs.

Technology is constantly changing to accommodate the changing needs of society and the environment.

Technology is used to advance science and modern science is used to advance technology.

Acquisition of manual skills is the result of communication, observation, experimentation and practice.

Specific knowledge, skills and attitudes are associated with specific jobs/trades.

Skills Objectives

The Industrial Technology Curriculum will provide the opportunity for students to develop and refine manual skills in several areas/fields of interest. Students will learn to identify and work with a wide range of tools, materials and equipment.

Learning the logical sequencing of actions required to produce a project (project selection, project planning/drafting, material selection, measuring, cutting, assembling, finishing) will help the students to develop sequential thought processes.

Additionally, students will be provided with the opportunities to develop:

- communication skills
- creative thinking skills
- critical thinking skills

- process skills
- problem solving skills
- decision making skills

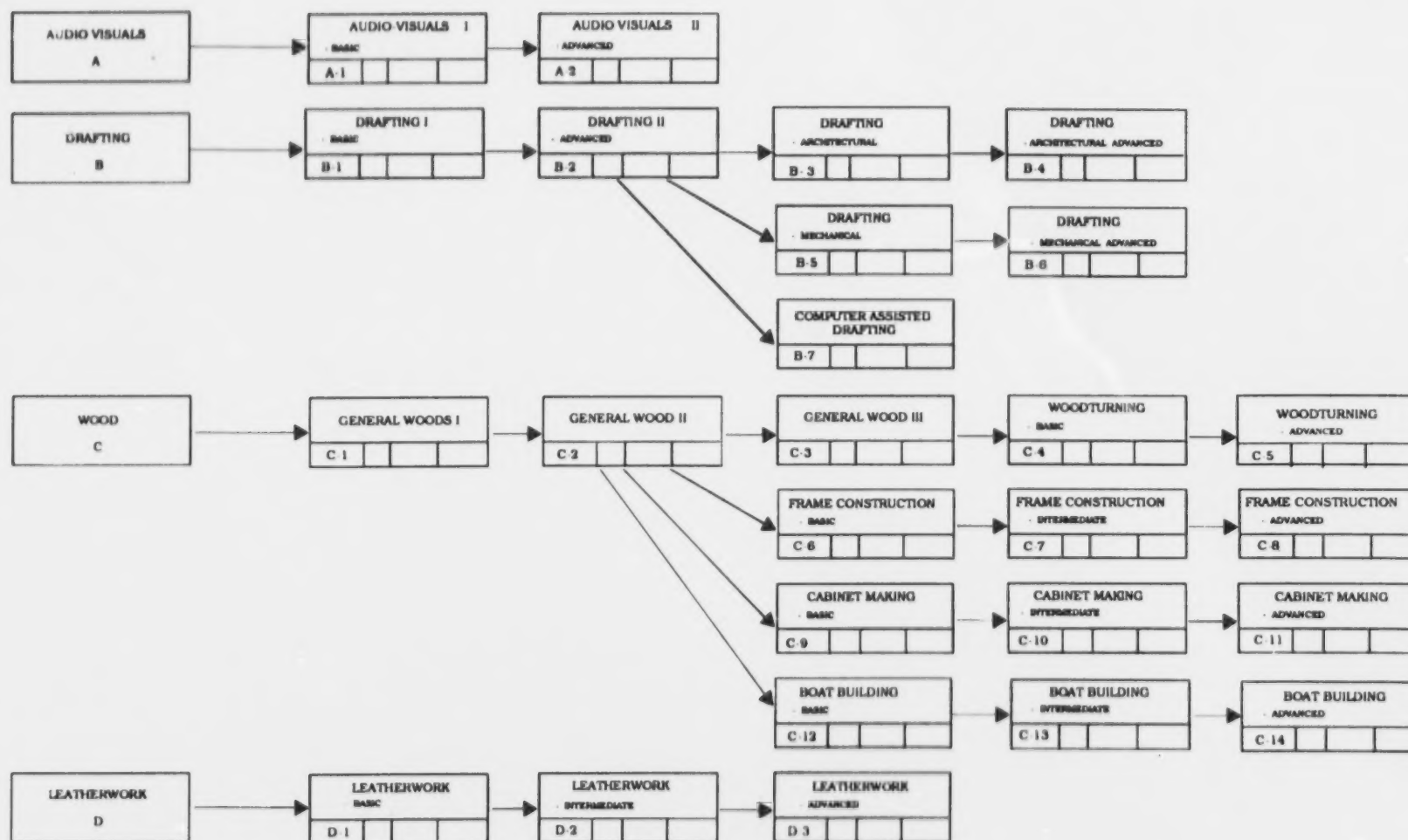
Attitudes

Students will be encouraged to participate in activities which will foster:

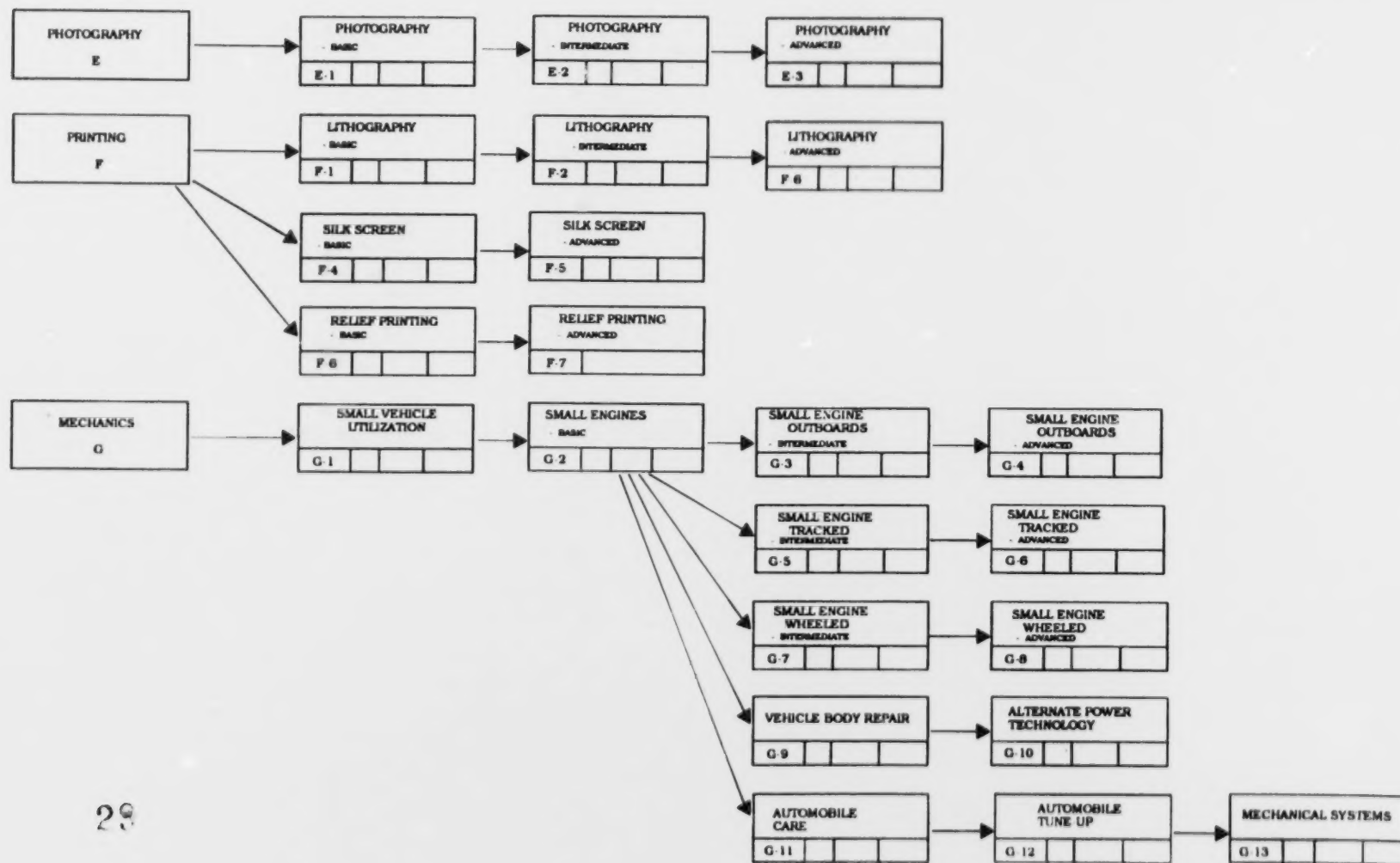
- self respect
- respect for others
- pride in one's work
- appreciation of craftsmanship
- accuracy and precision

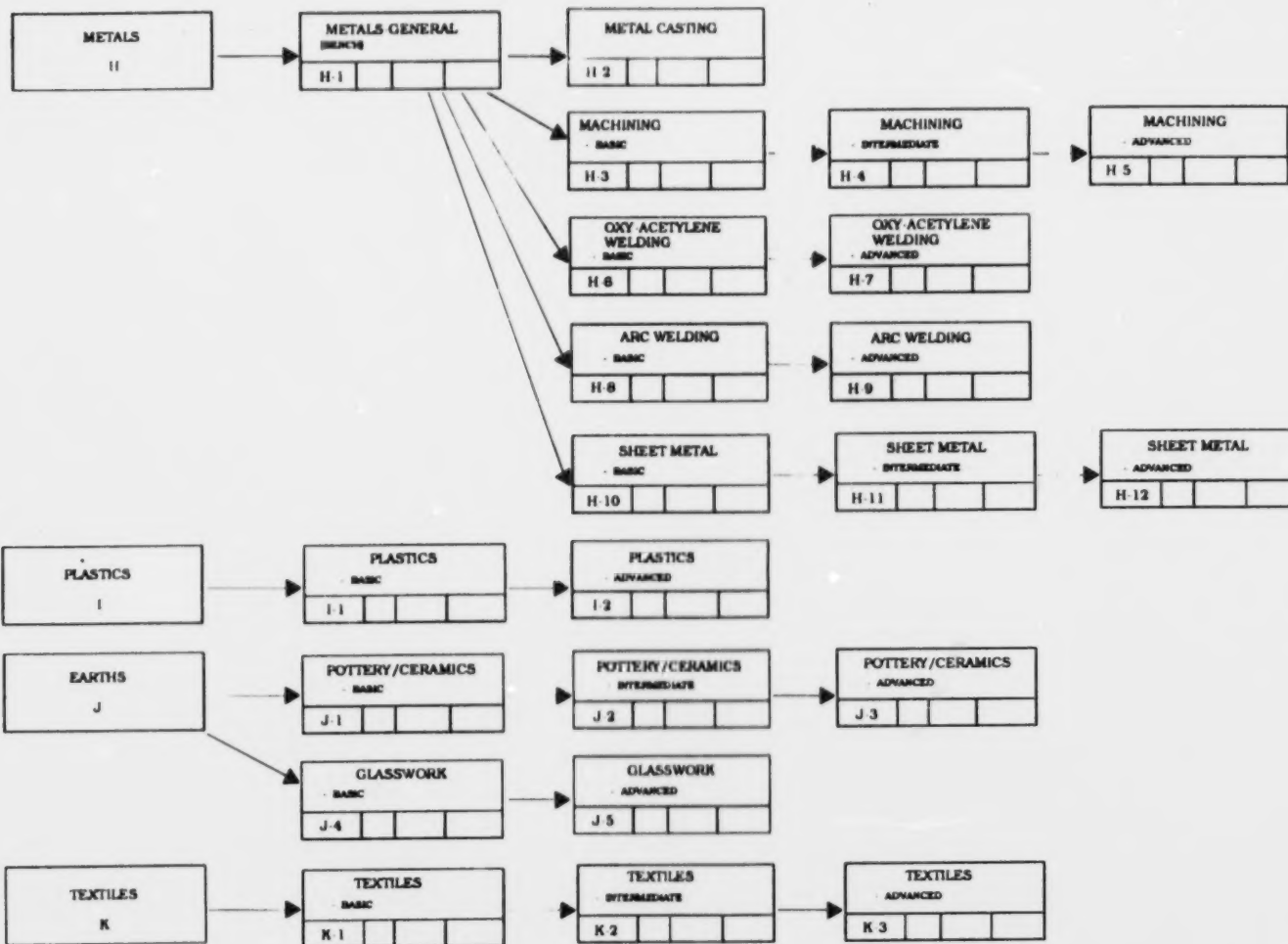
- self confidence
- perseverance
- positive work ethics
- cooperation
- concern for the safety of self and others

SCOPE & SEQUENCE

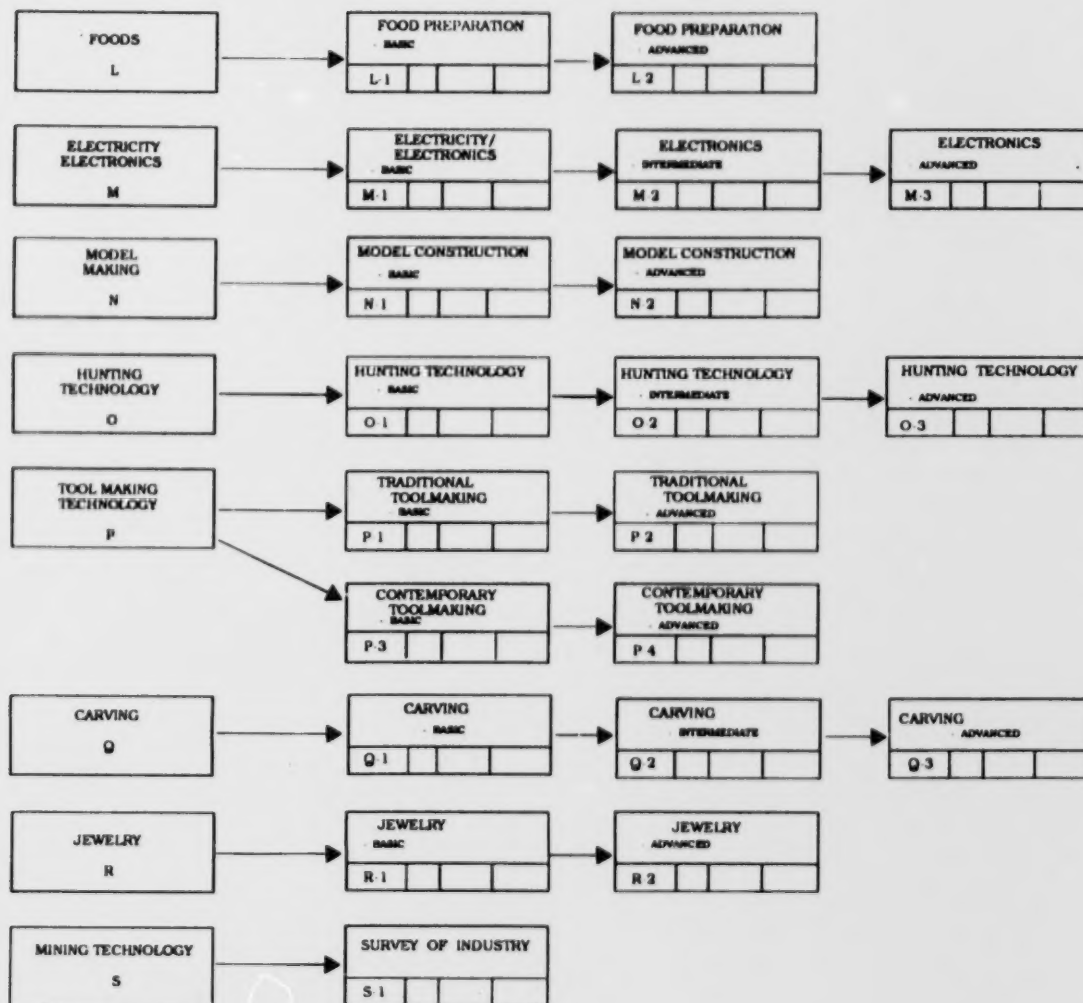


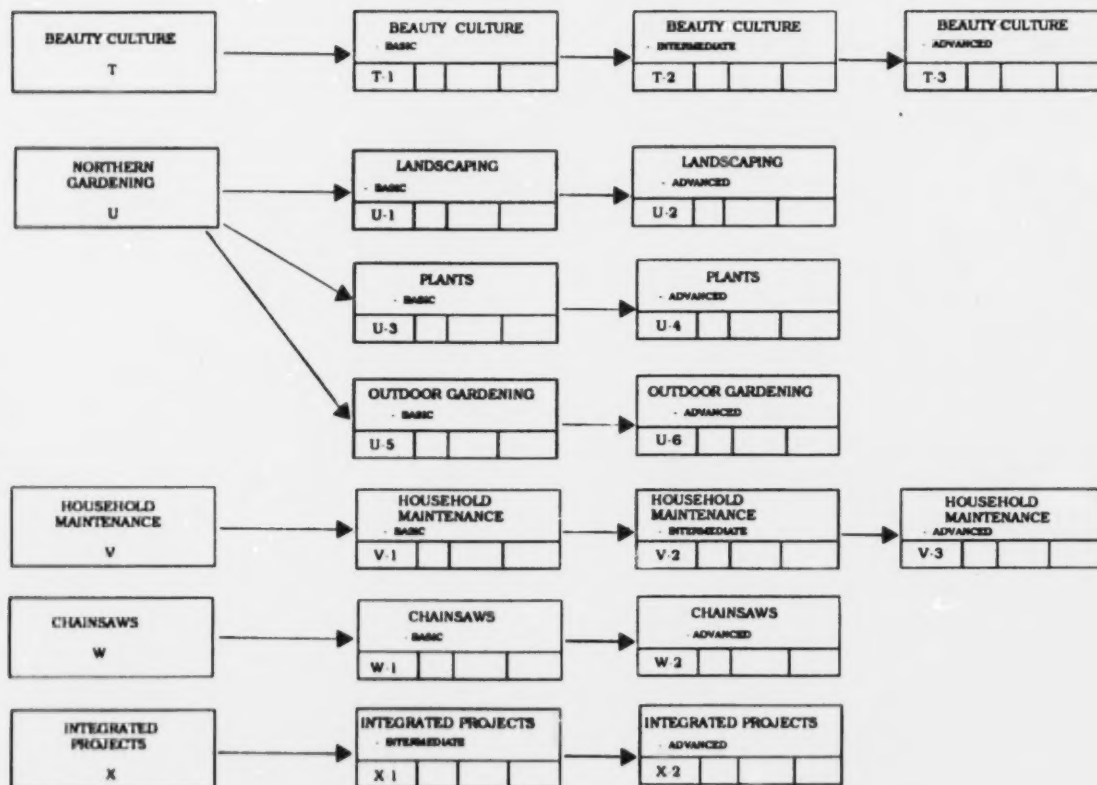
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Curriculum Organization and Structure

Junior High

Six percent (6%) of the time in any one year of junior high school is to be allocated to Practical Arts. School systems must determine which branch or combination of branches (*Home Economics, Business Education, Industrial Technology*) is to be included in each year's program. *Industrial Technology modules suitable for junior high have been marked with an asterisk (*) in the matrix.* Each of the selected modules should be taught for 20-30 hours. *All objectives, whether in junior high or secondary school, should be attained through a hands-on, process oriented approach achieved through the completion of worthwhile projects. The project should be the vehicle through which instruction takes place, the medium of the learning experience.*

Junior High / Secondary

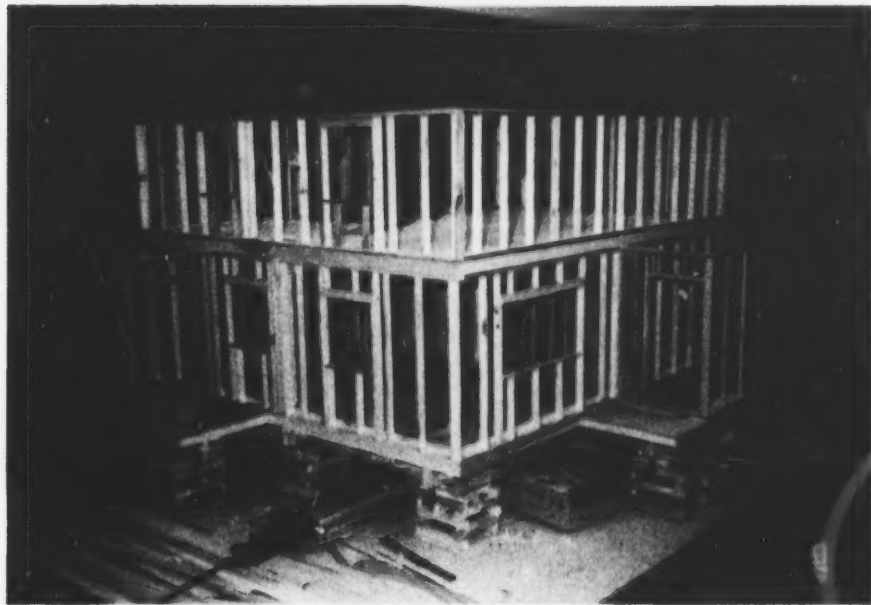
Modules may be taught to an entire class at the same time or teachers may elect to divide classes into groups. Different groups may be taught modules from different subject groupings, different modules from within the same subject grouping or different topics from within the same module. Where a class is divided into groups, a rotation schedule must be kept by the teacher. Such an arrangement assures each student an opportunity for practice time on all equipment without prolonged waiting periods. A system such as this may prove to be advantageous in smaller schools where equipment is limited (a school may have one wood lathe).

Secondary

Each Industrial Technology course may be taught for **3, 4 or 5 credits**. Each module at the secondary level carries a value of one credit and requires approximately 25 hours of instruction/practice time. Two or more courses may be offered in any one year. A maximum of thirty credits may be taken in secondary school. Three, four or five credit courses may be determined by selecting any three, four or five modules not already taken by the student, remembering that modules are sequenced within subject groupings and that no module may be taken before the preceding modules in that subject grouping (see sequence chart).

Procedurally, students will register in a course made up of three, four or five modules. The first such course, whether taken for three, four or five credits, will be registered as Industrial Technology 15A. Subsequent courses will be registered as Industrial Technology 25A and 35A unless a student completes more than one course in any one year in which case courses completed will be registered as:

15 A (3,4,5)	1725	15 B (3,4,5)	1726	in grade 10
25 A (3,4,5)	2725	25 B (3,4,5)	2726	in grade 11
35 A (3,4,5)	3725	35 B (3,4,5)	3726	in grade 12



Model HAP house designed and constructed by students at G.R.E.C., Iqaluit.

Guidelines for Program Development

Methodology

An Industrial Technology course for junior high grades may be produced by selecting any two or three modules of those identified in the subject groupings as suitable junior high modules.

Modules within each subject grouping have been sequenced and a second module from any subject grouping may not be taken until the first has been completed. Nevertheless, a prerequisite module may be waived if it can be determined through a series of pre-tests that a student is familiar with its contents. Modules specified as part of a secondary school course may not be taken at the junior high level. However, modules identified as acceptable junior high modules (marked with an asterisk *) may be taken as part of a secondary course. Scope and sophistication of the projects completed will delineate between the junior high and secondary module. This will be determined by the teacher. Approved first modules from any two or three approved subject groupings will comprise a junior high course.

Evaluation

Students should be evaluated (written, verbal, practical or a combination of these methods) on the content of each module. Modules completed satisfactorily should not be repeated by the student. Evaluation of student growth reflects stated behavioural change and should be based upon the three domains of learning:

<u>Affective</u>	<u>Cognitive</u>	<u>Psychomotor</u>
(Personal Growth)	(Knowledge)	(Project Production)

A detailed description of the components involved and the weight of each component should be given to and clearly understood by both parents and students. (see diagram)
Remember that student evaluation must be directly related to the acquisition of the goals and objectives of the program.

Some teachers may wish to have their students participate in the evaluation process through a self appraisal.

EVALUATION EXAMPLE

AFFECTIVE (subjective observation)

Attendance/Punctuality.....	5%
Attention/Effort.....	5%
Participation.....	5%
Total.....	15%

COGNITIVE (practical knowledge)

Research.....	5%
Written Assignments.....	5%
Written Tests & Examinations.....	25%
Total.....	35%

PSYCHOMOTOR (subjective observation)

Process/Procedure.....	10%
Project(s).....	20%
Practical Examination.....	20%
Total.....	50%

Records

It is imperative that individual student records be kept indicating the identification of each module included in each course taken. Module identification can be accomplished by inserting an Industrial Technology profile, appropriately completed, indicating the final mark and school year, with the student's cumulative record.

Every teacher should also keep records of:

- attendance;
- daily plans (activities, demonstrations, follow-up);
- list of students in each group;
- list of topics covered by each group;
- group rotation plan for the year;
- record of student achievement (test marks, product rating, etc.);
- inventory of equipment and supplies.

Reports on student achievement (module by module) should be sent to all parents on a regular basis as determined by the Board/Region.

Resources

A list of publishers, resource materials and a hand tools list will be included in a teachers' resource manual. The list will not be exhaustive, nor will it cover every subject grouping. Revisions / additions will be provided periodically. Teachers are encouraged to share ideas and resources.

Because of the diversity of programs, regions/schools may prefer building a library of reading materials to be used in research projects rather than purchase class sets of texts.

Specific Guidelines

Safety

It is incumbent upon the teacher to teach and practice safety continuously. Students should be instructed in the safe use of hand and power tools before actually using them. Processes should be practiced only after the hazards of such processes have been explained to the students. Teachers should ensure that students are properly attired to perform assigned tasks.

It is the responsibility of the teacher to supply continuous and vigilant supervision and to ensure that all students engage in only safe laboratory practices. A good safety program would include:

- machine guards and operating procedures approved or recommended by Occupational Health and Safety;
- regular and thorough instruction and revision;
- constant vigilance;
- checking and evaluating of student safety habits by the teacher;
- complete first aid equipment kept in first-class condition;
- floor constructed of non-skid material, and clearly marked working areas around all machinery;
- proper clothing, with particular attention to eye protection;
- regular inspection / maintenance of all tools and equipment;
- reporting and recording of all accidents;
- good housekeeping. (Your lab should always be clean and tidy. This will help to instill in the students a pride in their workplace and their work.)

The following are samples of safety regulations which the teacher might be expected to enforce.

- Power machine shall be used by selected students after specific instruction has been given with regard to safe operation and safety precautions.
- Power machines may be used only while the instructor is present in the laboratory.
- A student may use a machine which is equipped with approved guards.
- Approved eye protection must be worn for operations.

Of the basic steps in safety education, seven have been listed.

- Be familiar with Workers' Compensation and Occupational Health and Safety Regulations.
- Set a good safety example for students.
- Instruct each student thoroughly in the safety precautions of his/her job.
- Keep all tools sharp and in good condition.
- Properly use all safety devices.
- Reinforce safety instructions regularly. The laboratory will be as safe as the teacher makes it.
- Report accidents promptly to some senior school authority. If no other person is designated, this authority is the Principal.

It would be advisable that, where possible, each junior high and secondary school student complete a first aid course delivered by a qualified instructor.

NOTE: A good safety slogan to put into practice is:

A PLACE FOR EVERYTHING and EVERYTHING IN ITS PLACE

Miscellaneous

Opportunities sometimes present themselves for students (junior and senior secondary) to participate in short workshops offered locally. Occasionally, industry, trade unions, Occupational Health and Safety, Arctic College, Energy Mines and Resources Canada may offer short (1/2 - 1 day) courses on such items as new products / techniques, safety regulations, energy conservation, etc. (eg. Builder's workshop - R 2000). Some of these courses may be directly related to Industrial Technology modules within regional programs. It may be beneficial to some students to attend such workshops.

Implementation

Factors

Facility Organization and Class Size

The organization of the physical facilities is in part determined by the original building plan. There are, however, adjustments that can be made in the layout by the teacher to accommodate his/her style of teaching. The number of students in the class affects the way the lab or shop is organized. A number of factors must be considered in the final assignment of class load. These factors include:

- physical size of the shop or laboratory
- type of student
- amount of equipment
- type of programming
- type of course
- training and experience of the teacher

Safety of the student and the opportunity to obtain teacher contact are major considerations when class loads are being determined. It is suggested that class sizes be limited to a maximum of fifteen.

Responsibilities

1. Department

Responsibilities of the Department of Education in the implementation of new curricula are:

- * developing curricula and curriculum support documents with input from Regional/Board educators;
- * introducing curricula and related support documents to a team at the Regional/Board level;
- * assisting Regional/Board teams to develop implementation plans;

- * assisting Board teams in finding ways of meeting the needs identified in the implementation plan, if required;
- * assisting the Region/Board team with the monitoring of the implementation of the curriculum;
- * providing a means for inter-regional networking;
- * provide expertise to Regions/Boards for program development, if required;
- * evaluating the implementation of the curriculum and the appropriateness of the curriculum in meeting students' needs and improving student achievement.

2. Board/Region

While there are many examples of approaches a Region/Board might use to implement a curriculum, the following responsibilities must be addressed:

- * accepting responsibility for implementing a curriculum;

The most successful approach has been to establish a team to set the direction and actualize the implementation process. This team should include the following;

- Director/Superintendent - to provide leadership and decision-making at the Regional/Board level
- consultant - to provide overview of curricular concerns in various communities and classrooms
- principals - to provide the viewpoint of an instructional leader who is aware of school-based needs and concerns
- classroom teacher - to provide the perspective of educators who relate most closely with students and are aware of day to day curricular needs
- parent/board member - to provide a perspective on the non-curricular issues involved in implementation and provide support and understanding for the students outside of school.

A team approach provides a broader vision for implementation, and a greater likelihood that, despite personnel changes, the process will continue.

* planning program implementation (short and long term);

Short term planning should include:

- budgeting for classroom resources, workshop materials, supply teacher, training personnel, travel, etc.
- time for retraining, learning, sharing with colleagues, sharing with parents, etc.

Long term planning should include:

- maintaining a liaison with the initiatives of NWT Education and other regional and government departments
- orienting and updating principals and staff on curricular and implementation issues
- examining strategies to be used for student and program evaluation
- monitoring curriculum implementation
 - preparing personnel
 - involving parents in the process
 - interpreting and publicizing data collected
- * determining the specific responsibilities and supporting the efforts of other stakeholders in the process (i.e. parents, LEAs, teachers, etc.);
- * developing program materials based on the curriculum and suitable to the specific needs of the Region/Board;

Certain aspects of program development might be further delegated to the school or to the classroom teacher. Program might include specification of content, methodology or activities, teaching/learning materials for classroom use by teachers or student, sample teaching units, support documents clarifying the focus taken by the Region/Board in implementation, etc.